

Water 2050: Status of groundwater supply in northeastern Illinois



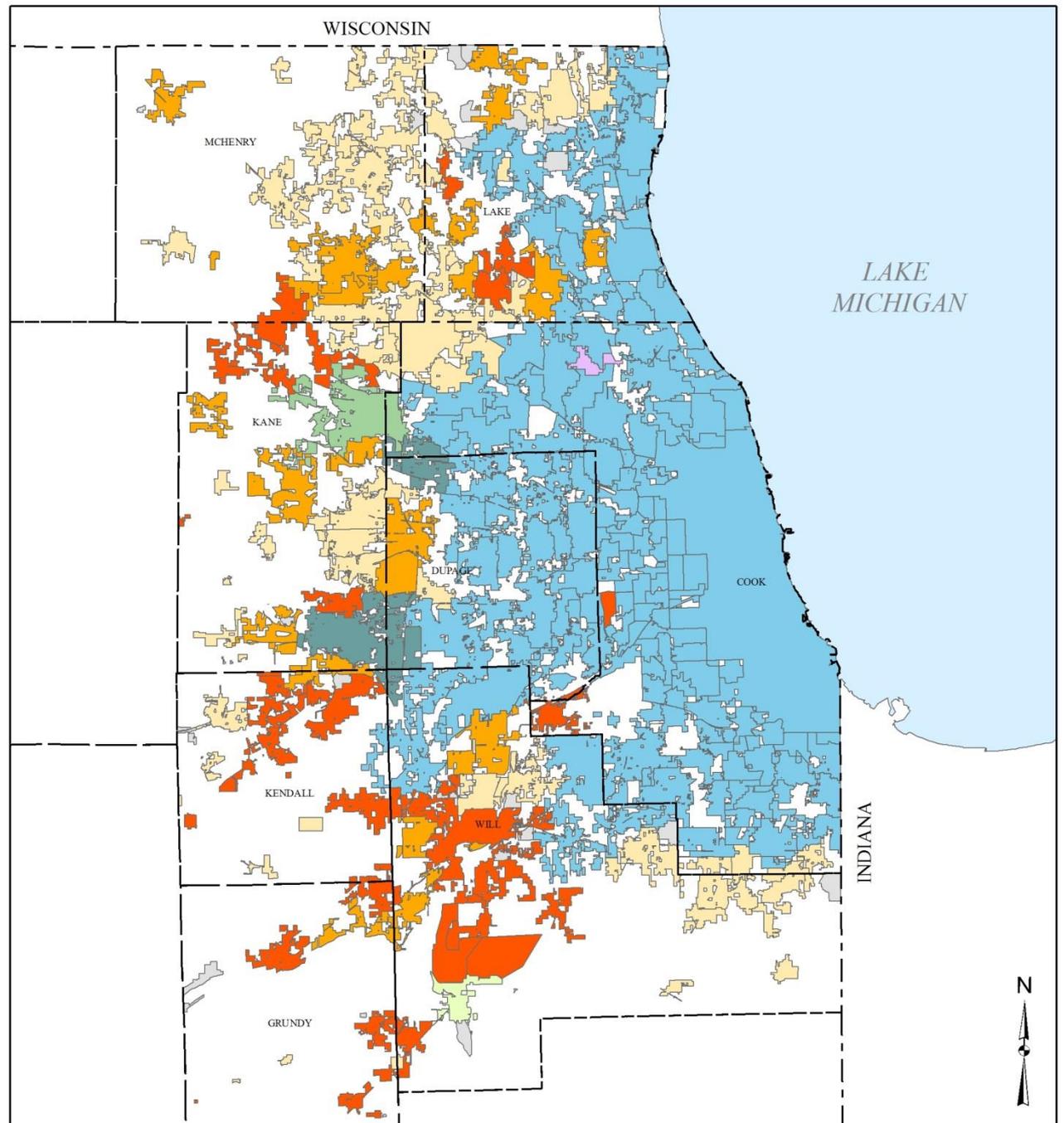
Daniel Abrams

Daniel Hadley

George Roadcap

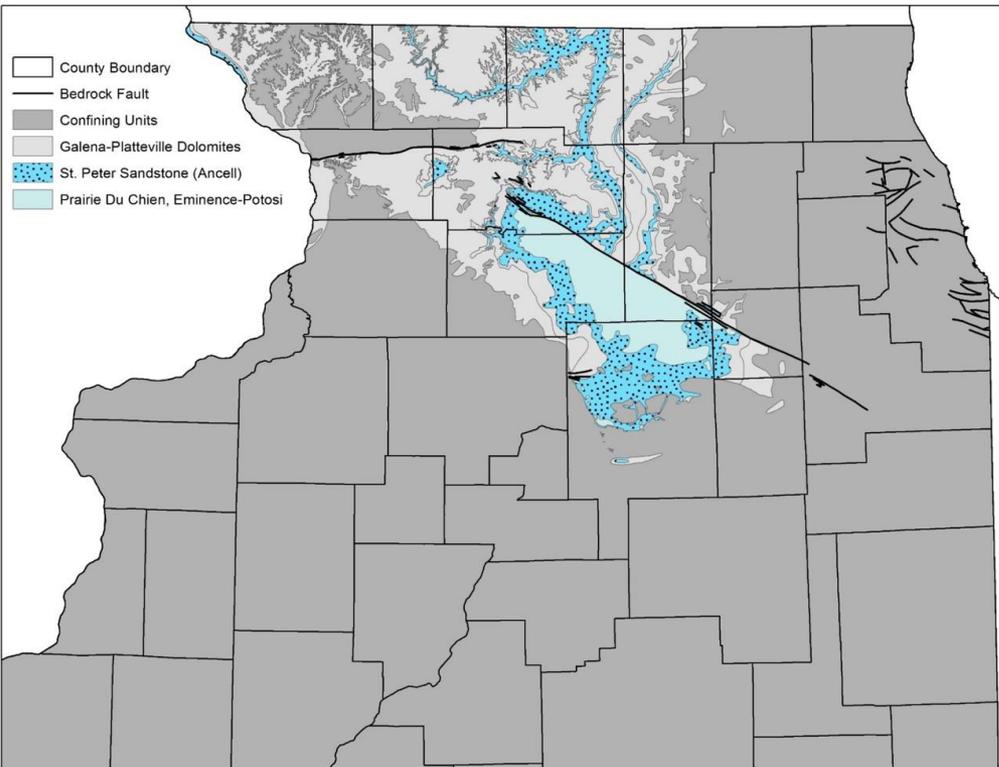
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SOURCE OF MUNICIPAL WATER IN 2012



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Source of deep groundwater



- Blue areas receive large amounts of recharge to the sandstone aquifer
- Dark gray areas receive virtually no recharge from vertical infiltration through the aquitards
- Water must migrate from the St. Peter outcrops to northeastern Illinois, which can take hundreds (thousands?) of years
- Sandwich fault impedes the horizontal flow of water

Geologic cross-section

-  Bedrock Aquitard
-  Major Aquifer
-  Saline Water
-  Geologic Contact

BEDROCK UNITS

- Sd Silurian Dolomite
- Mq Maquoketa Shale
- Gp Galena-Platteville Dolomite
- Sp St. Peter Sandstone
- Pdc Prairie du Chien Formation
- Ig Ironton-Galesville Sandstone
- Ec Eau Claire Formation
- Ms Mt. Simon Sandstone
- Pc Precambrian Granite

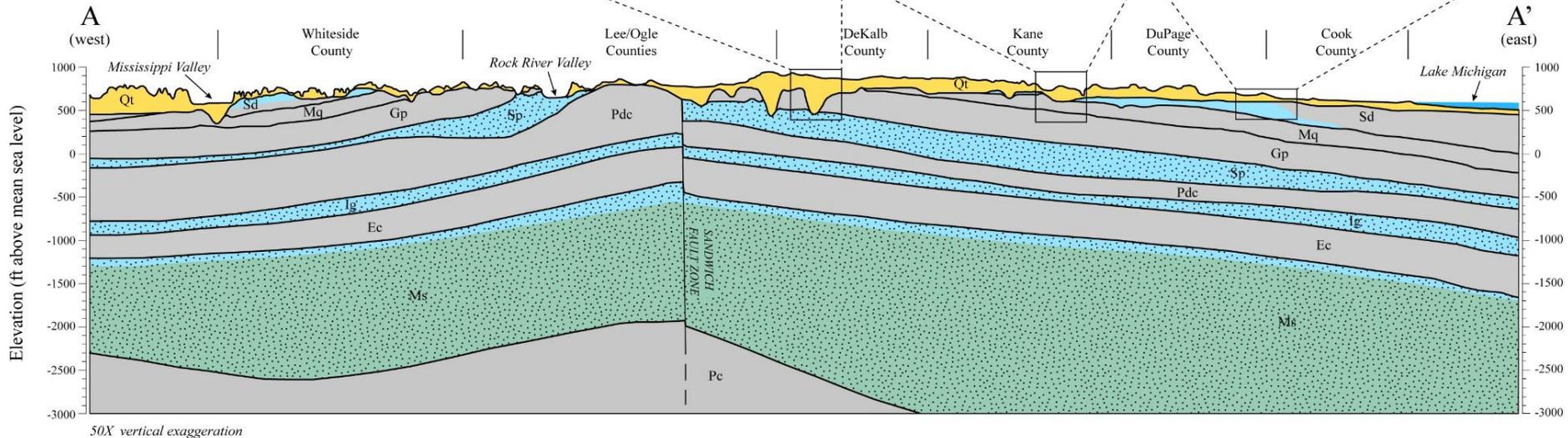
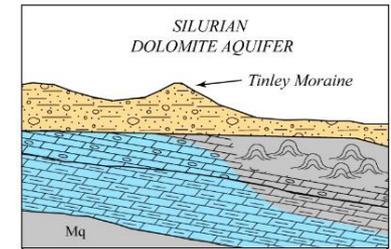
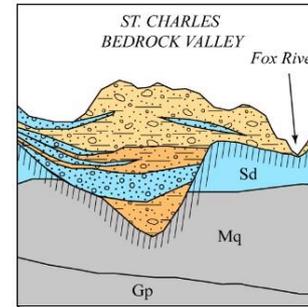
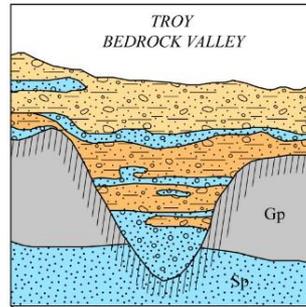
-  Weathered Bedrock

QUATERNARY (Qt) SYSTEM

-  Wedron Group
-  Glasford Group
-  Diamicton
-  Sand and Gravel

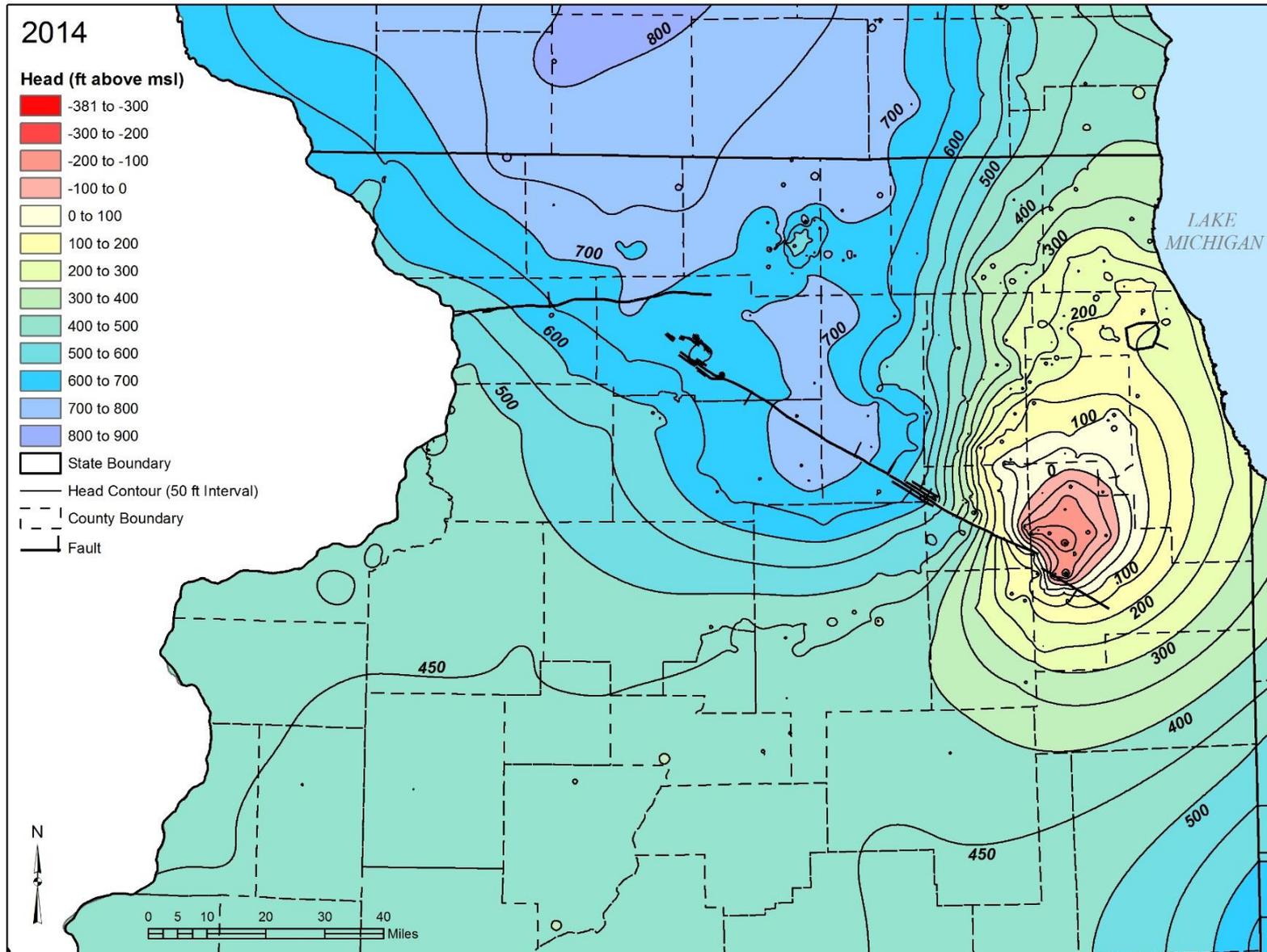
SILURIAN SYSTEM

-  Niagaran Series
-  Alexandrian Series
-  Reef Structures

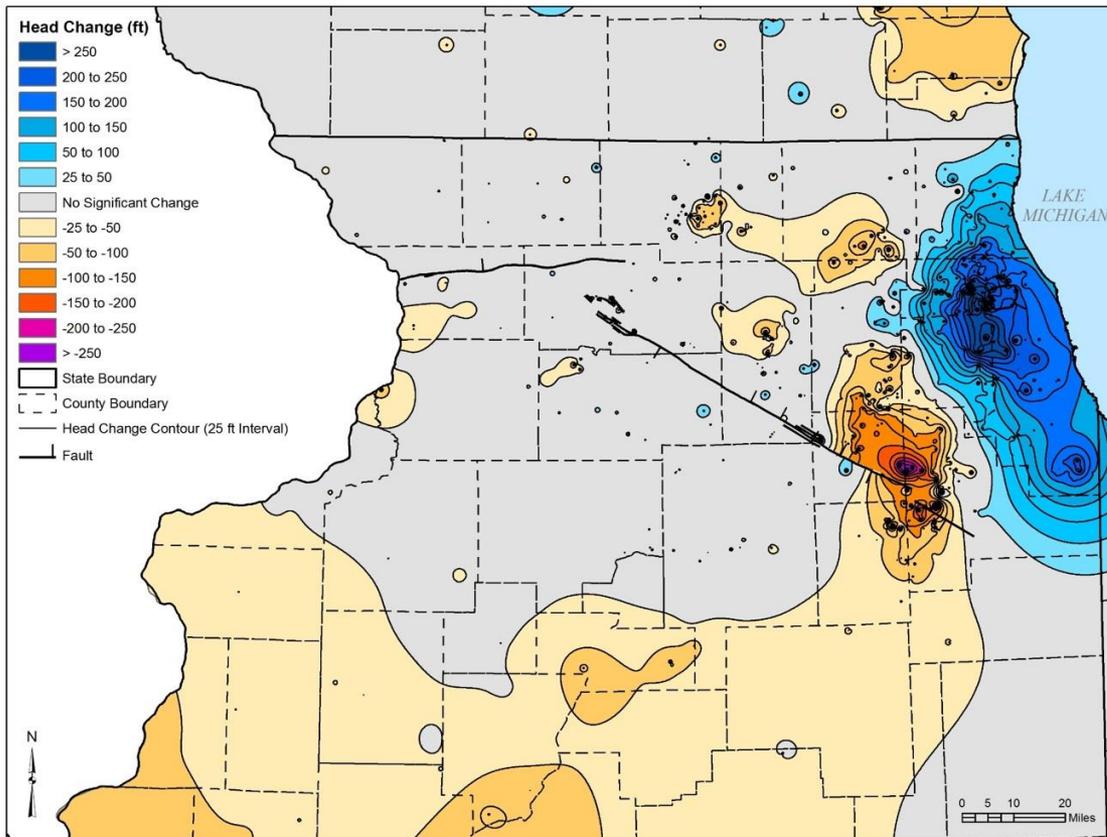


50X vertical exaggeration

Mass measurement- 2014



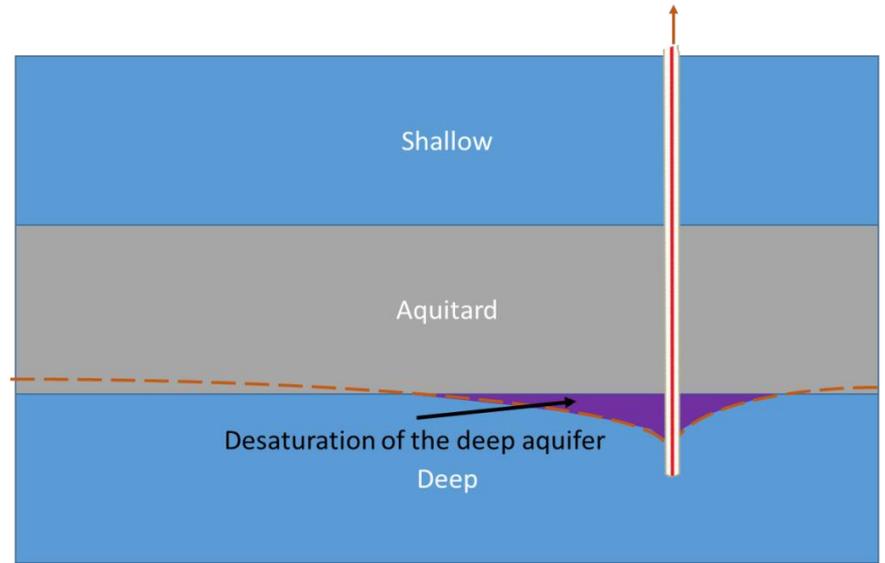
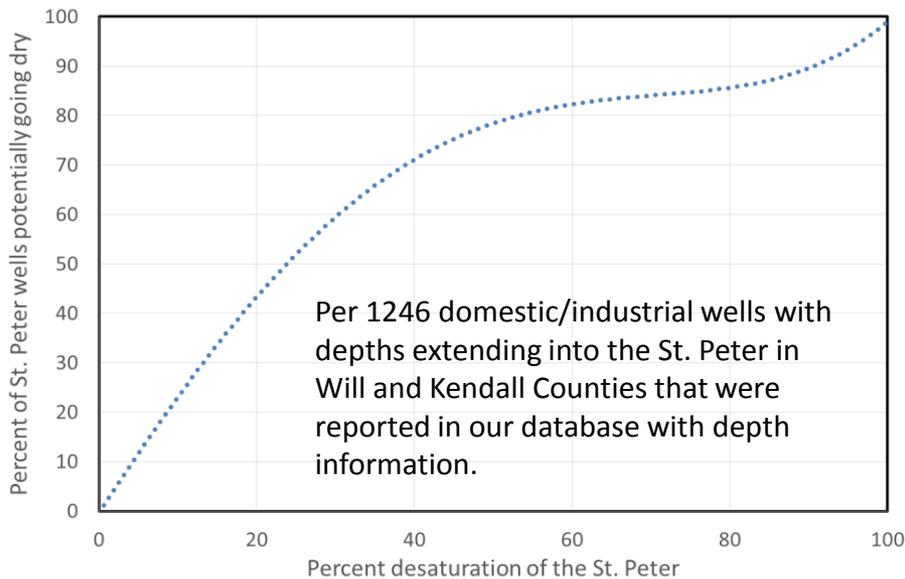
Head difference map- 1980 to 2014



- At risk communities:
 - Those reliant on the deep sandstone aquifer
 - Joliet and surrounding industries
 - Kendall County communities
- Heads are decreasing at a slower rate in:
 - Southwestern Kane County
 - McHenry County
 - Rockford
 - Dekalb

Implications of desaturation

Desaturation of the St. Peter

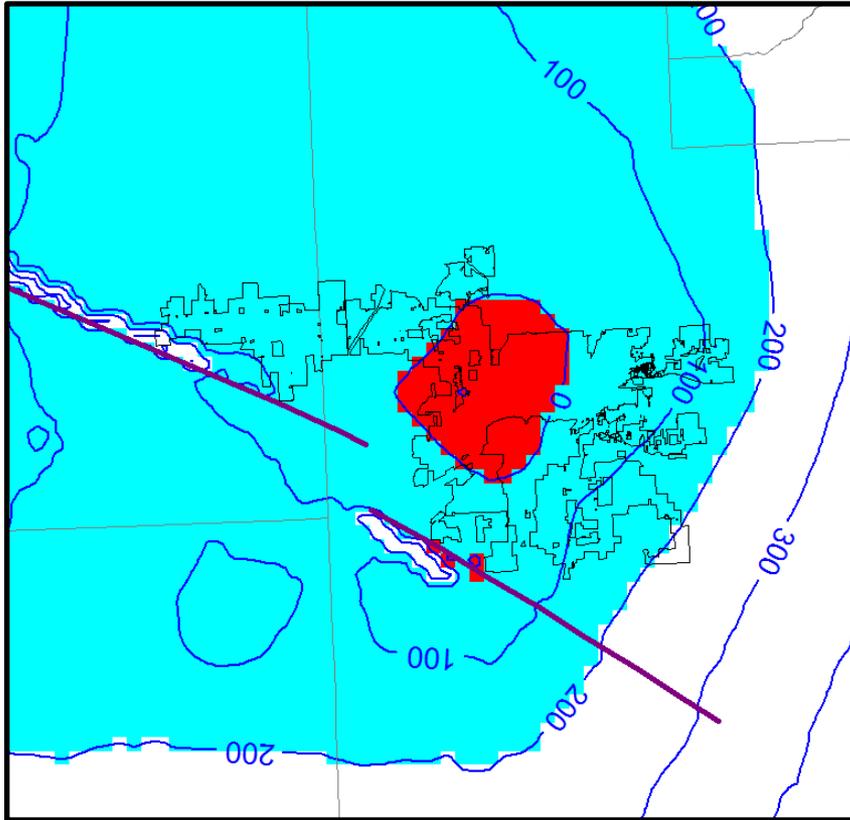


- Other implications
 - Desaturation of the Ironton-Galesville locally at high-capacity wells (a concern in Joliet and surrounding industries, a potential concern in Kendall County)
 - Increased costs of pumping
 - Must lift the water over a greater distance
 - Decreasing transmissivity

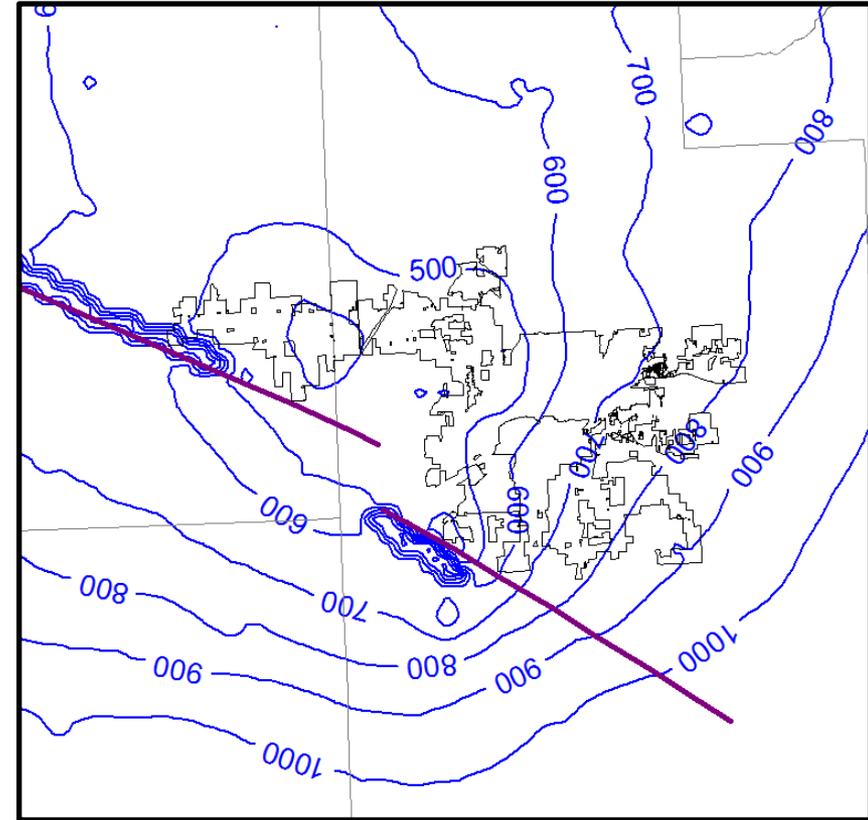
Model simulations 2014

- Red- Partially desaturated sandstone
- Cyan- Sandstone within 200 ft of desaturation
- Black- sandstone is completely desaturated
- Contours- Head above the top of the sandstone unit

St. Peter Sandstone



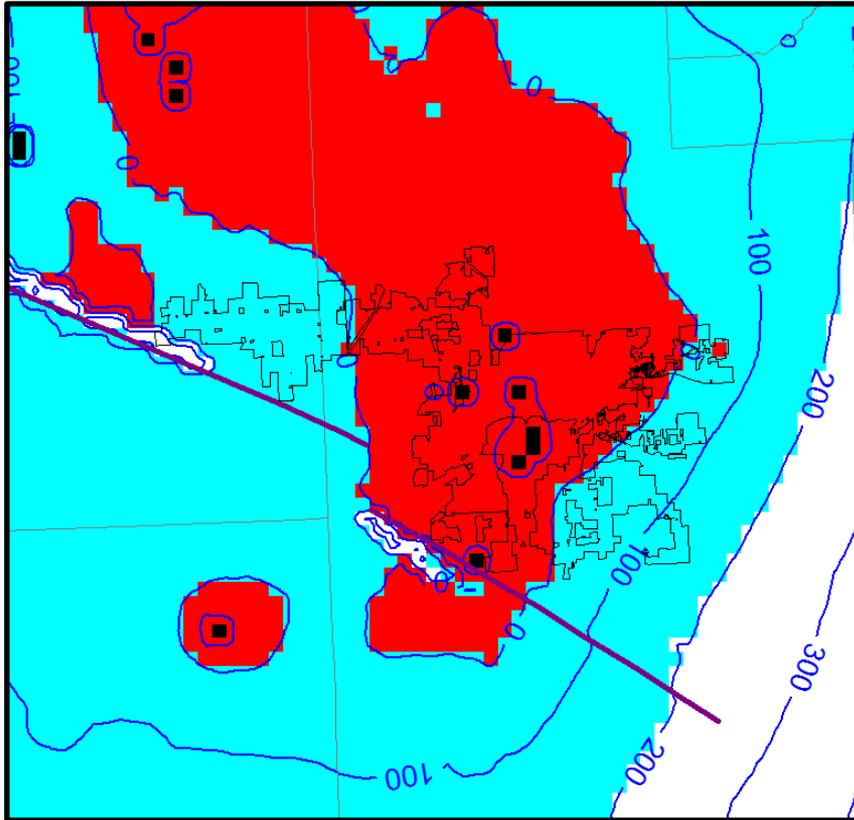
Ironton-Galesville Sandstone



Model simulations 2050

Red- Partially desaturated sandstone
Cyan- Sandstone within 200 ft of desaturation
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Contours- Head above the top of the sandstone unit

St. Peter Sandstone



Ironton-Galesville Sandstone

